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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/553,411

10/17/2005

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1454.1629

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21171 7590 12/08/2009
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EXAMINER

HO, HUY C

ART UNIT

PAPER NUMBER

2617

MAIL DATE

DELIVERY MODE

12/08/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|---------------------------------------|--|
| Office Action Summary | Application No. 10/553,411 | Applicant(s) BOSSERT ET AL. | |
| | Examiner HUY C. HO | Art Unit 2617 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08/26/2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, i.e., see Applicant Arguments/Remarks Made in an Amendment, filed 08/26/2009, with respect to the rejection(s) of claim(s) 9-20 under Sugar et al. (US Patent 6,785,520) and Sato et al. (US Patent 7,190,689) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Foschini et al. (US 2002/0142723) and Walton et al. (US 2004/0081131) as follows.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 2617

4. **Claims 9-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Foschini et al. (US 2002/0142723)** and further in view of **Walton et al. (US 2004/0081131)**.

As to **claim 9**, (Previously Presented) Foschini teaches a method of transmitting data by radio (see *Foschini, the abstract*), comprising:

using a plurality of subcarriers of a frequency band and a plurality of antennas for transmission such that each antenna transmits data using the plurality of the subcarriers (*Foschini, pp [4], [31], [56]-[57], [60], multiple antennas transmit data sub streams over different channels*);

dividing data for transmission into a plurality of elements such that the number of data elements corresponds to the number of subcarriers (*Foschini, pp [4], [31], [56]-[57], [60]*);

for each antenna, assigning each element to a subcarrier for transmission, such that for at least two antennas and at least one subcarrier, different elements are assigned (*Foschini, pp [92], data sub streams are assigned and modulated into different frequency bands*), and

before performing an OFDM modulation for each antenna, multiplying each element by an antenna-specific and an element-specific factor (*Foschini, pp [79]-[80], [89], each data sub stream is multiplied by a scaling factor*).

Foschini does not teach two antennas transmit different elements on one subcarrier. Walton teaches two antennas transmits two elements on a subband (see *Walton, pp [76]*), therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to modify teachings Foschini by combining teachings of Walton of transmitting OFDM symbols over a subband so as to reserve a set of subbands in the OFDM environment as taught by Walton (see *Walton, pp [5]-[11]*).

As to **claim 13**, (Previously Presented) Foschini teaches a method of transmitting data by radio (see *Foschini, the abstract*), comprising:

using a plurality of subcarriers of a frequency band and a plurality of antennas for transmission such that each antenna transmits data using the plurality of the subcarriers (*Foschini, pp [4], [31], [56]-[57], [60], multiple antennas transmit data sub streams over different channels*);

Art Unit: 2617

dividing data for transmission into a plurality of data elements such that the number of data elements corresponds to the number of subcarriers (*Foschini, pp [4], [31], [56]-[57], [60], multiple antennas transmit data sub streams over different channels*);

for each antenna, assigning each element to a subcarrier for transmission, such that for at least two antennas and at least one subcarrier, different elements are assigned (*Foschini, pp [92], data sub streams are assigned and modulated into different frequency bands*);

performing an OFDM modulation for each antenna to produce timing sequences of time-dependent signals (*Foschini, pp [79]-[80], [89]*); and

for at least one antenna, rearranging the order of the time-dependent signals after OFDM modulation (*Foschini, pp [31], [60], [62], [81], data sub streams are re-arranged cyclically over all of the transmit antennas*).

Foschini does not teach two antennas transmit different elements on one subcarrier. Walton teaches two antennas transmits two elements on a subband (*see Walton, pp [76]*), therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to modify teachings Foschini by combining teachings of Walton of transmitting OFDM symbols over a subband so as to reserve a set of subbands in the OFDM environment as taught by Walton (*see Walton, pp [5]-[11]*).

As to claim 20, (Previously Presented) Foschini teaches a transmitter to transmit data by radio using a plurality of subcarriers of a frequency band and a plurality of antennas for transmission such that each antenna transmits data using the plurality of subcarriers (*see Foschini, the abstract*), comprising:

division means for dividing the data into a plurality of elements such that the number of elements corresponds with the number of subcarriers (*Foschini, pp [4], [31], [56]-[57], [60], multiple antennas transmit data sub streams over different channels*); and

an OFDM modulator to perform OFDM modulation for each antenna to produce time-dependent signals (*Foschini, pp [79]-[80], [89]*);

wherein the transmitter comprises either:

Art Unit: 2617

multiplication means for multiplying each element for each antenna by an antenna-specific and element-specific factor before OFDM modulation (OFDM) (*Foschini, pp [79]-[80], [89], each data sub stream is multiplied by a scaling factor*), or rearrangement means for rearranging the order of the time-dependent signals after OFDM modulation (*Foschini, pp [31], [60], [62], [81], data sub streams are re-arranged cyclically over all of the transmit antennas*).

Foschini does not teach two antennas transmit different elements on one subcarrier. Walton teaches two antennas transmits two elements on a subband (*see Walton, pp [76]*), therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention was made to modify teachings Foschini by combining teachings of Walton of transmitting OFDM symbols over a subband so as to reserve a set of subbands in the OFDM environment as taught by Walton (*see Walton, pp [5]-[11]*).

As to claim 10, (Previously Presented) Foschini, as modified by Walton, teaches a method in accordance with claim 9, wherein the factor is a complex or real number, the absolute value of the factor being 1 (*Walton, pp [75]-[76]*).

As to claims 11, 16, 18, (Previously Presented) Foschini, as modified by Walton, further teaches a method in accordance with claims 9, 15, 13, wherein for at least two antennas a common pattern is used to assign each element to a corresponding subcarrier (*Foschini, pp [31], [60], [62], [81]*).

As to claims 12, 17, 19, (Previously Presented) Foschini, as modified by Walton, further teaches a method in accordance with claims 11, 16, 18, wherein the common pattern is a cyclic permutation (*Foschini, pp [31], [60], [62], [81]*).

As to claim 14, (Previously Presented) Foschini, as modified by Walton, further teaches a method in accordance with claim 13, wherein for at least two antennas, the order is rearranged in accordance with a rearrangement common pattern (*Foschini, pp [31], [60], [62], [81]*).

As to claim 15, (Previously Presented) Foschini, as modified by Walton, further teaches a method in accordance with claim 14, wherein the rearrangement common pattern is a cyclic

Art Unit: 2617

permutation (*Foschini*, pp [31], [60], [62], [81]).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUY C. HO whose telephone number is (571)270-1108. The examiner can normally be reached on Monday - Friday, 8:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on 571-272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Huy C Ho/
Examiner, Art Unit 2617

/Patrick N. Edouard/
Supervisory Patent Examiner, Art Unit 2617

Application/Control Number: 10/553,411

Page 7

Art Unit: 2617